Si, 0.68 percent of Mn, 0.010 percent of P, 0.014 percent of S, 23.3 percent of Cr, 6.4 percent of Ni, 2.8 percent of Mo and 0.15 percent of N, the remainder being iron and unavoidable impurities in unimportant amounts.

When manufactured by a conventional ingot-based method followed by solution treatment and quenching from 1025° C. in water, the following properties were obtained:

$$LE=620\ N/mm^2,\ UTS=830\ N/mm^2,\ EL=25 \text{ and } IS=35\ J.$$

This steel possessed excellent corrosion properties in chloride-containing solutions. However, it had a high propensity to segregation and brittleness. Cracks were formed in an ingot which cooled freely in air.

However, when the same steel was manufactured by the powder metallurgical technique described in Example 1, the propensity to segregation was completely eliminated and the propensity to brittling was reduced. The forging quality was also markedly improved.

Alloying of copper into the steel often results in a considerably reduced malleability when manufacturing products from ingots, owing to the existence of low-melting copper-rich segregation regions in the structure. By manufacture by a powder metallurgical method according to the invention, these problems can be completely eliminated since no segregations will then occur.

Alloying of nitrogen into ferritic-austenitic steel-especially when the structure remains constant (i.e. alloying of nitrogen followed by an increase in a ferrite-stabilizing element such as Si, Cr or Mo or by a decrease in an austenite-stabilizing element such as C, Ni or Mn)—results in a marked increase of the yield strength. According to investigations carried out, nitrogen has a yield strength-increasing effect up to nitrogen contents higher than those hitherto used in ferritic-austenitic steels, that is, in respect of nitrogen contents in excess of 0.20 percent also. However, the manufacture of such high-nitrogen steels involves considerable problems when manufacturing products from ingots. The problems include the occurrence of harmful segregations, the formation of porous material and, if the solution limit is exceeded, considerable difficulties in achieving forging without cracks arising, great difficulties in sawing and uneven properties. By using a powder metallurgical method according to the invention, these difficulties can be overcome. By working at an overpressure of nitrogen in the casting box and in the atomizing chamber, it is even possible to manufacture powder having a higher nitrogen content than the solubility limit (approximately 0.40 percent). Steels having much higher yield strengths (>750 N/mm^2) can therefore be produced.

As mentioned above, parts for separating machines operating in highly corrosive environments are suitable products to be manufactured from stainless steel obtained by the method according to the invention. The method according to the invention may be varied in many ways within the scope of the following claims.

What is claimed is:

1. A method of manufacturing stainless ferritic-austenitic steel containing up to 0.10 percent of C, up to 4.0 percent of Si, up to 2.0 percent of Mn, from 20 to 30 percent of Cr, from 3 to 8 percent of Ni, from 1.0 to 6.0 percent of Mo, up to 0.5 percent of V and up to 4.0 percent of Cu, the remainder being iron and unavoidable impurities in unimportant amounts comprising the steps of:

preparing a melt of the steel with a nitrogen content higher than about 0.10 percent and an austenite content not less than about 20 percent,

gas atomizing said melt to form a powder,

compacting said powder into a body,

heat-treating said body at a temperature of from about 950° to about 1250° C., and

cooling the heat-treated body in water, oil or air.

2. A method according to claim **1**, wherein the steel is given a maximum carbon content of 0.06 percent to achieve an especially good resistance to intercrystalline corrosion.

3. A method according to claim **1**, wherein the steel is given a nitrogen content of from about 0.30 to about 0.80 percent and an austenite content of from about 20 to about 40 percent to achieve a high yield strength.

4. A method according to any of claims **1** to **3**, wherein in addition to said heat treatment, the steel is also aged at a temperature of from about 400° to about 500° C. to improve the yield strength.

5. A method according to any of claims **1** to **3**, wherein the steel is given a nitrogen content higher than about 0.40 percent, and the production of said powder is performed with a nitrogen overpressure.

6. A method according to any of claims **1** to **3**, wherein said powder is compacted by means of isostatic or semi-isostatic compaction.

* * * * *